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10/775,351	02/10/2004	Warren M. Farnworth	2269-6105US(2003-0885.00/	3156

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EXAMINER
KOCH, GEORGE R

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
05/29/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTOMail@traskbritt.com

Office Action Summary	Application No.	Applicant(s)	
	10/775,351	FARNWORTH, WARREN M.	
	Examiner	Art Unit	
	George R. Koch III	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,8 and 30-32* is/are pending in the application.

4a) Of the above claim(s) *30-32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-4 and 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant now combines the deposition system embodiment (which appears to be the embodiment of Figure 8 and paragraphs 0041-0045) with a selective material consolidation system (which appears to be discussed in the context of Figure 10 and paragraphs 0036, 0037, 0054, 0055, 0057, 0059, and 0065). The originally filed application appears to treat these as separate embodiments, the first using a deposition system and the second using an consolidation system from the perspective of a laser. Thus, it appears that the combination of both the deposition system and the selective material consolidation system in one embodiment is new matter. It is noted that nearly every section cited by applicant as support for the new claim amendments (paragraphs 0036, 0037, 0054, 0055, 0057, 0059, and 0065, as recited in applicants remarks) relates to the reservoir or stereolithographic system and not the deposition system.

Claim Rejections - 35 USC § 102

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams (US 2002/0123213 A1)

As to claim 1, Williams discloses a system (see Figure 12) for selectively depositing a material on a previously formed workpiece, comprising:

a platform (platform 20) sized and configured to support the workpiece, the workpiece including at least one semiconductor die, during a deposition process;

a deposition system (item 194) configured to deposit at least one laver of unconsolidated material on the workpiece to a specific thickness;

a sensing system (camera 140) configured to measure a level of an upper surface of the workpiece and a surface level of the at least one layer of unconsolidated material deposited thereon,

and a selective material consolidation system configured to at least partially consolidate a selected portion of the at least one layer of unconsolidated material (see paragraph 0075, which discloses that the deposited material is "permitted to at least partially harden, or consolidate, prior to forming another layer thereon"). Therefore, Williams is capable of selectively consolidating the layers.

As to claim 8, Williams discloses that the substrate is a semiconductor wafer (for example, in paragraph 0094, Williams makes reference to "semiconductor devices 10", which are also shown in Figure 12).

5. Claims 1-3 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Takamori (US 6,319,317 B1).

Takamori discloses system for selectively depositing a material on a previously formed workpiece, comprising a platform (Figure 4, item 52) for supporting the workpiece during a deposition process, a deposition system (item 86) configured to deposit the material on the workpiece to the specific thickness, and a sensing system (Figure 4, item 105) configured to measure over the semiconductor die both an upper surface including a previous material previously deposited thereon, the sensing system further configured to continuously directly measure in a dimension orthogonal to the platform a surface level during material deposition of the material on the upper surface according to direct measurments in the dimension substantially orthogonal to the platform until the surface level of the material is directly measured to be the specific thickness. (see, for example, column 12, lines 50-63). The apparatus can operate on the claimed die and claimed surfaces. Since Takamori is a sensor with a transmitter and receiver, and applicant's sensor is a transmitter and receiver, it anticipates the claim.

This sensing system for measuring an upper surface is consider capable of measuring and upper surface *over a semiconductor die including the upper surfaces and including a previous material previously deposited thereon.* This apparatus in Takamori is considered *capable* of coating any type of substrate, including the claimed *semiconductor die including a previous material previously deposited thereon.*

Applicant's "selective material consolidation system" appears to be nothing more than the material which is applied by the apparatus. The partial consolidation appears to be a natural

effect of the material dispensed. Therefore, Takamori is considered capable of operation as a selective material consolidation system.

As to claim 2, Takamori discloses that the deposition system is a spin-coating deposition system (see Figure 2, and especially claim 1, line 2, which discloses that the apparatus including "means for rotating a substrate").

As to claim 3, Takamori discloses that the sensing system includes a sensor (item 105) for both measuring the upper surface of the workpiece (prior to deposition) and for monitoring the surface level of the material deposited on the upper surface of the workpiece (during deposition). Takamori discloses measurement of the "spreading state" of the dispensed solution, which is a measurement of the before, during and after of the thickness or lack of it.

As to claim 8, Takamori discloses coating a semiconductor wafer (recited, for example, at column 1, line 10-11). Takamori is specifically directed to coating a semiconductor wafer with a resist film.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams (US 2002/0123213 A1) as applied to claims 1 and 8 above, and further in view of Farnworth (US 6,482,576),

As to claim 2, Williams is silent as to whether the deposition system is a spin-coating deposition system. Williams neither recites nor excludes a spinning operation in the platform.

However, Williams shows similar structure as Farnworth (US 6,482,576). Farnworth discloses a platform (item 20) and teaches that "in a preferred embodiment, the platform 20 is rotatable by movement 68 about a vertical axis 70." (see column 6, lines 18-32). One in the art would appreciate that the rotating step would enable spreading of the deposited material; and also enable deposition to different locations of the semiconductor substrate. Therefore, it would have been obvious to one of ordinary skill at the time of the invention to have used a spin coating deposition system as in Farnworth in order to enable spreading of the deposited material; and also enable deposition to different locations of the semiconductor substrate.

As to claim 3, Williams discloses at least one sensor (camera 140) positioned and configured to measure the upper surface of the workpiece and monitor the surface level of the material deposited on the upper surface of the workpiece (see paragraphs 0079-0083).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams and Farnworth as applied to claims 2 above, and further in view of Whitman (US 6,642,155).

As to claim 4, Willaims discloses measuring the upper surface of the workpiece and the surface level of the deposited material (see rejection of claim 3 above), but does not disclose using separate sensors for each function.

However, Whitman discloses that it is known in measuring the thickness during spin coating operations to utilize multiple sensors. Whitman uses to the multiple sensors to track coated and uncoated areas in order to properly coordinate the coating operation (as described in

column 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such sensors in order to achieve coordination of the coating operation.

9. Claims 1-3 and 8 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Takamori (US 6,319,317 B1) and Subramanian (US 6,270,579)

Takamori discloses system for selectively depositing a material on a previously formed workpiece, comprising a platform (Figure 4, item 52) for supporting the workpiece during a deposition process, a deposition system (item 86) configured to deposit the material on the workpiece to the specific thickness, and a sensing system (Figure 4, item 105) configured to measure over the semiconductor die both an upper surface including a previous material previously deposited thereon, the sensing system further configured to continuously directly measure in a dimension orthogonal to the platform a surface level during material deposition of the material on the upper surface according to direct measurements in the dimension substantially orthogonal to the platform until the surface level of the material is directly measured to be the specific thickness. (see, for example, column 12, lines 50-63). The sensor measures the "spreading state" and therefore is a continuous measurement system. The apparatus can operate on the claimed die and claimed surfaces. This measurement is considered to be a direct measurement in the context of applicant's *direct* measurement, which is measuring the surface data of the substrate and dispense by a transmitter and receiver (as described in applicant's own specification 0042). The apparatus can operate on the claimed die and claimed

surfaces. Since Takamori is a sensor with a transmitter and receiver, and applicant's sensor is a transmitter and receiver, it anticipates the claim.

This sensing system for measuring an upper surface is consider capable of measuring and upper surface *over a semiconductor die including the upper surfaces and including a previous material previously deposited thereon.* This apparatus in Takamori is considered *capable* of coating any type of substrate, including the claimed *semiconductor die including a previous material previously deposited thereon.*

Applicant's "selective material consolidation system" appears to be nothing more than the material which is applied by the apparatus. The partial consolidation appears to be a natural effect of the material dispensed. Therefore, Takamori as applied above is considered capable of operation as a selective material consolidation system. However, it can be argued that Takamori does not disclose the selective material consolidation system.

However, Williams discloses that the consolidation system can be nothing more than a delay which permits the deposit material to partially harden or consolidate (see paragraph 0075). One in the art would appreciate that this permits layer by layer building of structures. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a partial consolidation system as in Williams in order to enable layer by layer manufacturing of the semiconductor elements.

As to claim 2, Takamori discloses that the deposition system is a spin-coating deposition system (see Figure 2, and especially claim 1, line 2, which discloses that the apparatus including "means for rotating a substrate").

As to claim 3, Takamori discloses that the sensing system includes a sensor (item 105) for both measuring the upper surface of the workpiece (prior to deposition) and for monitoring the surface level of the material deposited on the upper surface of the workpiece (during deposition). Takamori discloses measurement of the "spreading state" of the dispensed solution, which is a measurement of the before, during and after of the thickness or lack of it.

As to claim 8, Takamori discloses coating a semiconductor wafer (recited, for example, at column 1, line 10-11). Takamori is specifically directed to coating a semiconductor wafer with a resist film.

10. Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Takamori OR Takamori and Williams as applied to claims 1-3 and 8 above, and further in view of Whitman (US 6,642,155).

As to claim 4, Takamori discloses measuring the upper surface of the workpiece and the surface level of the deposited material (see rejection of claim 3 above), but does not disclose using separate sensors for each function.

However, Whitman discloses that it is known in measuring the thickness during spin coating operations to utilize multiple sensors. Whitman uses to the multiple sensors to track coated and uncoated areas in order to properly coordinate the coating operation (as described in column 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such sensors in order to achieve coordination of the coating operation.

Response to Arguments

11. Applicant's arguments with respect to claims 1-4 and 8 filed 12/19/2007 have been considered but are unpersuasive. Applicant argues that the prior art does not teach both deposition systems and a selective material consolidation system in one claim (see remarks, page 8, last paragraph).

12. However, as an initial issue, it appears that the combination of a deposition system and a selective material consolidation system in one claim is new matter.

13. Additionally, Williams teaches that it is known for the consolidation system can be nothing more than a delay which permits the deposit material to partially harden or consolidate (see paragraph 0075).

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George R. Koch III whose telephone number is (571) 272-1230 (TDD only). If the applicant cannot make a direct TDD-to-TDD call, the applicant can communicate by calling the Federal Relay Service at 1-866-377-8642 and giving the operator the above TDD number. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/George R. Koch III/
Primary Examiner, Art Unit 1791

5/23/2009